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Influence of ewe feeding systems on carcass quality of suckling lambs

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RIASSUNTO – Influenza del sistema di alimentazione delle pecore sulla qualità delle carcasse degli agnelli allattati. *In questo lavoro sono riportati i principali risultati di una prova mirata a studiare gli effetti dell'alimentazione delle pecore sulla qualità delle carcasse degli agnelli allattati. Due gruppi di pecore di razza Merinizzata Italiana con i rispettivi agnelli, sono stati allevati ed alimentati, l'uno (P) al pascolo senza alcuna integrazione, l'altro (S) all'ovile con fieno ad libitum e concentrato. Gli agnelli sono stati abbattuti a 100 d di vita. Il peso vivo netto, il peso carcassa e le rese alla macellazione non hanno evidenziato differenze di rilievo fra le tesi. Il colore del grasso caudale ha evidenziato una tinta più alta nel gruppo P, mentre l'adiposità delle carcasse, l'incidenza del grasso periviscerale e la resa in grasso del coscio sono risultate superiori nel gruppo S.*

Key words: suckling lambs, ewes' feeding system, carcass quality.

INTRODUCTION – Numerous studies have evidenced significant differences in the carcass and meat quality of grass-fed and concentrate-fed lambs. The main differences regard carcass fatness (Murphy *et al.*, 1994), subcutaneous fat colour (Prache and Theriez, 1999), meat colour (Priolo *et al.*, 2002a) and fatty acid composition (Enser *et al.*, 1998). The use of grazing in lamb feeding favours the presence of substances in the meat which are beneficial to human health. Different methods, based on the spectrophotometric properties of fat have been proposed to verify the origin of the product (Priolo *et al.*, 2002b). The objective of the present study is to verify if and to what extent the carcass quality of suckling lambs is affected by ewe feeding systems.

MATERIALS AND METHODS – Twenty-four pregnant Merinizzata Italiana ewes were selected before lambing and were divided into two groups of twelve. One group of ewes was allowed to graze a natural pasture every day (pasture group). The pasture was divided into six paddocks of equal areas so that animals grazed rotationally. The second group was penned indoors in a multiple box and was fed hay *ad libitum* and commercial concentrate (stall group). After lambing, all ewes stayed with their respective lambs for the duration of the trial. The concentrate supplied to the stall group was regulated every week with the aim of obtaining the same daily gain between the pasture and stall lambs. The lambs were weighed weekly during the feeding trial. All the lambs were slaughtered at 100 days of age and empty body weight (EBW) was recorded. After slaughter the carcasses were classified for fatness using a 15-point scale. The warm carcasses were weighed and chilled for 24 h at 4°C. Twenty-four h *post mortem* subcutaneous caudal fat colour was assessed by the L* a* b* system using a Minolta CR 300 colorimeter (illuminant C). The carcasses were then split and the right sides were weighed and sectioned according the method proposed by ASPA (1991). The right pelvic limb was dissected into the main tissue components. Data were analysed by ANOVA with a monofactorial design.

RESULTS AND CONCLUSIONS – Slaughtering data and carcass characteristics are shown in Table 1. Empty body weight, carcass weight and slaughter yield (calculated as warm carcass weight on EBW) were comparable among the groups. Pasture lambs had a lower fatness (P<0.05) compared to stall lambs. The lower fatness observed for pasture lambs could be a consequence of greater physical activity and exposure to adverse environmental conditions compared stall lambs. Significant differences were found in the subcutaneous caudal fat colour, showing a wider hue angle (P<0.05) in pasture lambs in agreement with the results of Priolo *et al.* (2002a) who asserted that the difference in adipose tissue colour was almost certainly due to the presence of carotenoids in the carcass of grass lambs. No significant differences were registered between the groups with regard to commercial cuts, while the incidence of kidney (P<0.001) and pelvic (P<0.01) fat, in accordance with subjective subcutaneous fatness, was statistically lower in pasture lambs as opposed to stall lambs (Table 2). The anatomical composition of the pelvic limb is given in Table 3. Dissection evidenced that the pelvic limb of pasture lambs had less fat (P<0.001) and tended to have more lean (P=0.17) and more bone content (P=0.08) than the stall lambs. In conclusion, the present study highlighted that while ewe feeding systems do not affect slaughter yield and commercial cuts, they do have an influence on carcass adiposity and external fat colour, although, in our opinion, these differences are imperceptible to consumers. As a result the exploitation of the pasture-based feeding system could represent a valid alternative to intensive concentrate-based systems.

Table 1. Slaughtering data and carcass characteristics.

	Pasture	Stall	SEM	P-value
Empty body weight (kg)	20.61	19.95	0.592	0.586
Warm carcass weight (kg)	11.10	10.75	0.372	0.652
Net warm yield (%)	53.70	53.71	0.459	0.991
Carcass fatness (1 to 15-scale)	7.00	8.17	0.255	0.018
Subcutaneous fat colour at 24 h				
*L**	75.76	75.90	0.634	0.913
Chroma	7.25	8.74	0.595	0.220
Hue angle	73.09	65.80	1.827	0.044

Table 2. Proportions of carcass joints (% side).

	Pasture	Stall	SEM	P-value
Pelvic limb	33.97	33.73	0.217	0.582
Thoracic limb	20.33	20.09	0.205	0.566
Neck	9.78	9.55	0.158	0.484
Steaks + Brisket	22.80	22.64	0.174	0.671
Lumbar + Abdominal region	11.95	12.43	0.160	0.137
Kidney	0.76	0.69	0.024	0.134
Kidney fat	0.30	0.64	0.054	0.000
Pelvic fat	0.11	0.23	0.021	0.002

Table 3. Anatomical composition of pelvic limb.

	Pasture	Stall	SEM	P-value
Pelvic limb (kg)	1.76	1.66	0.629	0.484
Total lean (%)	71.07	70.28	0.286	0.170
Total fat (%)	3.19	5.12	0.295	0.000
Bone with tendons (%)	25.74	24.60	0.323	0.077

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REFERENCES – **ASPA**, 1991. Metodologie relative alla macellazione degli animali di interesse zootecnico e alla valutazione e dissezione della loro carcassa. ISMEA, Roma, 39-45. **Enser**, M., Hallett, K.G., Hewett, B., Fursey, G.A.J., Wood, J.D., Harrington, G., 1998. Fatty acid content and composition of UK beef and lamb muscle in relation to production system and implications for human nutrition. Meat Sci. 49:329-341. **Murphy**, T.A., Loerch, S.C., McClure, K.E., Solomon, M.B., 1994. Effects of grain or pasture finishing systems on carcass composition and tissue accretion rates of lambs. J. Anim. Sci. 72:3138-3144. **Prache**, S., Theriez, M., 1999. Traceability of lamb production systems: carotenoids in plasma and adipose tissue. Anim. Sci. 69:29-36. **Priolo**, A., Micol, D., Agabriel, J., Prache, S., Dransfield, E., 2002a. Effect of grass or concentrate feeding systems on lamb carcass and meat quality. Meat Sci. 62:179-185. **Priolo**, A., Prache, S., Micol, D., Agabriel, J., 2002b. Reflectance spectrum to trace grass feeding in sheep: influence of measurement site and shrinkage time after slaughter. J. Anim. Sci. 80:886-891.